

Number: SB2X-95-27R1

Issued: 09 Jun 2021

Revised: 29 Jun 2021

SNS SUBJECT: 95-00 SPECIAL PURPOSE EQUIPMENT - Replacement of CAPS Rocket Igniter

1. COMPLIANCE

Mandatory: Cirrus considers this Service Bulletin to be MANDATORY. Accomplish this Service Bulletin within 50 flight hours or at next scheduled maintenance, whichever occurs first. Compliance time begins upon receipt of this Service Bulletin.

This Service Bulletin was revised to update Compliance, Effectivity, Warranty Information, Material Information, and Accomplishment Instructions. Operators who have successfully complied with the original release of this Service Bulletin, dated 09 Jun 2021, need take no further action.

WARNING: Compliance with this Service Bulletin requires maintenance of the Cirrus Airframe Parachute System (CAPS) system that may only be accomplished by a Cirrus Aircraft trained and authorized parachute system technician.

2. EFFECTIVITY

SR20 Serial 1693

SR22 Serials 1796, 2088, 2093, 2101, 2107, 2108, 2122, 2123, 2140, 2193, 4365 thru 4367, 4372 thru 4375

SR22T Serials 1377 thru 1379, 1396, 1397

3. APPROVAL

FAA approval has been obtained on all technical data in this Service Bulletin that affects type design.

4. PURPOSE

On affected aircraft, the CAPS rocket igniter assembly must be inspected for voltage / resistance readings, and replaced.

5. DESCRIPTION

This Service Bulletin contains instructions for the inspection and subsequent replacement of the CAPS rocket igniter assembly.

6. WARRANTY INFORMATION

Cirrus will cover all parts and labor costs for this Service Bulletin if the work is accomplished within the Compliance time period and the work is performed at a Cirrus Authorized Service Center. The Warranty Claim Form, along with the Electrical Readings Worksheet linked below in Step 11.J, must be properly filled out and submitted to Cirrus in order to obtain a warranty credit.

7. MANPOWER REQUIREMENTS

4.0 man-hours

8. OTHER PUBLICATIONS AFFECTED

N/A

9. WEIGHT AND BALANCE

N/A

10. MATERIAL INFORMATION

The following part is required to comply with this Service Bulletin. Part can be obtained from a Cirrus Authorized Service Center or Parts Distributor. Obtain the following part.

Item No.	Description	P/N or Spec.	Supplier	Quantity
1	CAPS Rocket Igniter Assembly	29556-001	Cirrus	1
2	Aluminum Screws	21914-001	Cirrus	2
3	Nylon Screws	26675-001	Cirrus	3

11. ACCOMPLISHMENT INSTRUCTIONS

A. Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Catch Cloth	-	Any Source	Protect work area.
Nitrile Gloves	-	Any Source	Handle CAPS rocket igniter assembly.

B. Remove key from ignition.

C. Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.

CAUTION: Ensure hands are clean while working with interior trim components.

D. Remove CAPS handle access cover and install safety pin.

E. Remove bulkhead 222 trim panel and carpet. (Refer to AMM 25-10)

F. Remove access panel CB6 and CB7 from bulkhead 222. (Refer to AMM 6-00)

G. Remove access panel RE3. (Refer to AMM 6-00)

H. To prevent debris and components from falling into bottom of empennage, place catch cloth below rocket and parachute assembly.

WARNING: Activation of rocket igniter requires 25 lb (11.25 kg) pull force. Use caution during procedures to not introduce any unnecessary pulling force on the activation cable.

I. Perform "Electric Ignition Checkout Procedure" detailed in Inspection/Check - Cirrus Airplane Parachute System. (Refer to AMM 95-00)

Note: Document all readings taken during the Electric Ignition Checkout Procedure. Results should be provided to Cirrus following performance of this Service Bulletin.

J. Submit results of electric ignition checkout inspection to Cirrus at:

https://cirrusaircraft.formstack.com/forms/worksheet_service_bulletin_sb2x9527

K. Replace CAPS rocket igniter assembly.

WARNING: Maintenance on the CAPS system may only be accomplished by a Cirrus Aircraft trained and authorized parachute system technician. Airframe and Powerplant license alone is not sufficient credentials for performing CAPS maintenance.

The rocket assembly is a life limited component. Replacement of the CAPS rocket igniter assembly does **NOT** restart life limit of the entire rocket assembly.

Note: Document all serial/lot numbers identified during CAPS rocket igniter assembly replacement. Information should be provided to Cirrus following performance of this Service Bulletin.

- (1) Remove CAPS rocket. Discard existing aluminum and nylon screws. (Refer to CAPS CMM 95-01-01)
 - (2) Remove, shunt, and retain CAPS rocket igniter assembly. (Refer to CAPS CMM 95-01-01)
 - (3) Install new CAPS rocket igniter assembly (item 1). (Refer to CAPS CMM 95-01-01)
 - (4) Install CAPS rocket using new aluminum (item 2) and nylon (item 3) screws. (Refer to CAPS CMM 95-01-01)
 - (5) Perform Inspection/Check - Cirrus Airplane Parachute System. (Refer to AMM 95-00)
- L. Remove catch cloth from below CAPS compartment.
- M. Visually inspect CAPS compartment for security, leaks, loose or missing hardware, moisture, and general condition. (Refer to AMM 5-20)
- N. Install access panel RE3. (Refer to AMM 6-00)
- O. Install access panel CB6 and CB7 to bulkhead 222. (Refer to AMM 6-00)
- P. Install bulkhead 222 trim panel and carpet. (Refer to AMM 25-10)
- Q. Return removed CAPS rocket igniter assembly to Vulcan Systems, Inc. as follows:

CAUTION: Do not render the igniter inert (fired) prior to shipment. Doing so will negate any testing to be performed by Vulcan Systems, Inc.

- (1) Retain all internal and external packaging that was received from Cirrus with replacement igniter.

WARNING: Wear nitrile gloves while handling the igniter as it is possible, but not likely, that slight residue of BKNO3 dust may exist on the surface of the piccolo tube portion of the igniter.

- (2) Once CAPS rocket igniter assembly has been removed from bulkhead end of rocket motor, ensure igniter electrical wires are shunted to facilitate safe handling and transport of igniter.

WARNING: Do not disassemble any portion of CAPS rocket igniter assembly.

- (3) Using packaging from Cirrus that accompanied replacement CAPS rocket igniter assembly:
 - (a) Place igniter into pink anti-static sleeve.
 - (b) Place sleeve into cardboard tube.These are "inner pack" requirements to ship igniter.
- (4) Re-use UN 4G/4GV outer box from Cirrus and place tube containing igniter into outer box.
- (5) Seal packaging as specified by instructions on box.
- (6) Ensure orange 1.4G placard is intact (or replace as needed) and label as standard Hazmat shipment.

- (7) Ensure shipping documents provided to driver and attached to box include:
 - Vulcan Systems SDS for igniter (See attached copy)
 - Vulcan Systems DOT Competent Authority (See attached copy)
- (8) Ensure Competent Authority and UN Numbers referenced on your FedEx Hazmat declarations and labels are:
 - EX Number: EX-1998090143
 - UN Number: UN-0325: Igniters
- (9) Ensure net explosives weight for shipment is 0.1 lb (45.4 g).
- (10) Return shipment to:
ATTN: Mark Thomas
Vulcan Systems, Inc.
255 Moore Drive
Florence, CO 81226

R. Complete airplane records by noting compliance with SB2X-95-27R1 in Aircraft Logbook.

To submit a Technical Publication change request, visit:
http://servicecenters.cirrusdesign.com/tech_pubs/SR2X/serviceloopform.asp
or contact us by email at techpubs@cirrusaircraft.com.



VULCAN SYSTEMS, INC.

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Florence, CO 81226
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Florence, CO 81226
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SAFETY DATA SHEET

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Product Identifier:	Vulcan Systems, Inc. TRM-350-018 and TRM-350-018A Piccolo Tube Igniters.
Other Means of Identification:	EX Numbers: - EX-1998090143 UN Numbers: - UN-0325: Igniters
Recommended Use:	Ignition of solid propellant rocket motors; used for extracting an unmanned or manned aircraft emergency parachute system.
Restrictions on Use:	No information available.
Manufacturer:	Vulcan Systems, Inc. 255 Moore Drive Florence, CO USA (719) 204-2000
Emergency Telephone Number:	800-255-3924 (24 hrs. - ChemTel)

SECTION 2 – HAZARD IDENTIFICATION

Classification of the Substance or Mixture:	In accordance with 29 CFR 1910.1200, this substance is classified as an <i>Explosive Item</i> . Hazard Class & Division: 1.4G Explosive - Chemicals and items which present no significant hazard: chemicals and items which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.
GHS Label Elements:	Signal Word: Warning Symbols: Explosive Hazard Pictogram:  GHS01 Hazard Statements: H204 - Fire or projection hazard. Precautionary Statements: P210 - Keep away from heat, hot surface, sparks, open flames and other ignition sources. No smoking. P243 - Take precautionary measures against static discharge. P262 - Do not get in eyes, on skin, or on clothing.

	P264 - Wash hands thoroughly after handling. P270 - Do not eat, drink or smoke when using this product. P370+P373 - In case of fire: DO NOT fight fire when fire reaches explosives. P370+P380 - In case of fire: Evacuate area. P401 - Store in accordance with Local, State, and Federal regulations. P501 - Dispose of in accordance with Local, State, and Federal regulations. Other hazards not otherwise classified that have been identified during the classification process: This product burns rapidly and generates a significant heat and light for a short period of time. During a fire, irritating and toxic gases or fumes may be released by thermal decomposition or combustion. Potential Health Effects: • Eye: Not a likely route of exposure. May cause eye irritation. • Skin: Not a likely route of exposure. Low hazard for typical industrial and aircraft maintenance handling. • Ingestion: Not a likely route of exposure. • Inhalation: Not a likely route of exposure. May cause respiratory tract irritation.
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SECTION 3 – COMPOSITION, INFORMATION ON INGREDIENTS

Chemical Name: Chemical Mixture. Stainless steel cylindrical case containing a mixture of Boron and Potassium Nitrate pyrotechnical material.

Common Name and Synonyms: Igniters

Trade Secret Statement: The specific chemical identity and/or exact percentage (concentration) of composition of some ingredients has been withheld as a trade secret in accordance with paragraph (i) of 29 CFR 1910.1200. The specific chemical identity and percentage is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of paragraph (i).

Chemical Mixtures:	Chemical Names (CAS Numbers):	Hazard Classification:	Formulation Weight Percent
BKNO3	Boron (7440-42-8)	Flam. Sol. 2, H228 Acute Tox. 4, H302 Eye Irrit. 2A, H319 STOT SE 3, H335	>60%
	Potassium Nitrate (7757-79-1)	Ox. Sol. 2, H272	
	Lupersol		
	Laminac		
Boron/Barium Chromate	Boron (7440-42-8)	Flam. Sol. 2, H228 Acute Tox. 4, H302 Eye Irrit. 2A, H319 STOT SE 3, H335	<40%
	Barium Chromate (10294-40-3)	Ox. Sol. 2, H272 Acute Tox. 4, H302 + H332 Carc. 1A, H350	

SECTION 4 – FIRST AID MEASURES	
Eye Contact	• Check for and remove any contact lenses. • In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. • Seek medical attention.
Skin Contact	• In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Seek medical attention if irritation develops or persists.
Burns	• Minor burns can be treated as per normal first aid procedures. • Seek medical attention for all other burn types.
Inhalation	• If inhaled, remove to fresh air immediately. • If not breathing, give artificial respiration. • If breathing is difficult, give oxygen, loosen tight clothing such as a collar, tie, belt or waistband. Seek medical attention.
Ingestion	• DO NOT induce vomiting unless directed to do so by medical personnel. • If conscious and alert, rinse mouth. • Never give anything by mouth to an unconscious person. • If large quantities of this material are swallowed, immediately seek medical attention. • If not breathing, give artificial respiration. If breathing is difficult, give oxygen, loosen tight clothing such as a collar, tie, belt or waistband. Get medical aid. • Loosen tight clothing such as a collar, tie, belt or waistband.
Most Important Symptoms and Effects, Both Acute and Delayed:	• Adverse health effects are not reasonably expected from normal use of product.
Indication of any Immediate Medical Attention and Special Treatment Required:	• Treat according to symptoms.

SECTION 5 – FIRE FIGHTING MEASURES	
Suitable and Unsuitable Extinguishing Media:	• Do not attempt to fight fires involving Igniters. • Once the igniter materials have been consumed, secondary fires may be extinguished with water, powder or CO₂ extinguishers.
Specific Hazards Arising from the Chemical:	• Boron/Potassium Nitrate is explosive. • Keep away from heat, sparks, and open flame. • Avoid impact, friction, and static electricity. • Contact with acids may lead to the release of hydrogen gas.
Special Protective Equipment and Precautions for Fire-Fighters:	• Do not fight fires involving Igniters. • Once the igniter materials have been consumed, secondary fires may be fought with water, powder or CO₂ extinguishers. • All emergency personnel must be equipped with full protective clothing including self contained breathing apparatus. • Fire fighters should protect their eyes and skin from flying particles. • In order to prevent eye injury, do not look directly at Boron/Potassium Nitrate fires from pyrotechnic material. • Exposure Hazards During Fire:

	○ Danger! Rapid deflagration may occur when this product is exposed to burning; excessive impact; rapid or prolonged heating; or application of other sources of ignition. ○ Hazards of this reaction may include heat, flame, and poisonous oxides of nitrogen.
Decomposition Products:	• During a fire, irritating and toxic gases or fumes may be released by thermal decomposition or combustion.
Special Instructions Notes:	• This product burns rapidly and generates a significant heat and light for a short period of time.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:	• Personal Precautions: • Clean up spills immediately and handle carefully. • Spills of this material may represent an explosion hazard. • Protective Equipment: • If no source of ignition present, no special PPE is required. • Emergency Procedures: • Spill of material will normally not require emergency response team capabilities. • Isolate area and remove sources of friction, impact, heat, low level electrical current, electrostatic energy.
Methods and Materials for Containment and Cleaning Up:	• For Containment: ○ Prevent product from entering drinking water supplies, sewer system or streams. • For Cleaning Up: ○ Sweep or scoop up using non-sparking, non-static producing tools. ○ Check product quality and condition prior to repackaging. ○ Replace articles in packaging and boxes and seal securely. ○ Package for disposal according to Local, State, and Federal regulations.

SECTION 7 – HANDLING AND STORAGE

Precautions for Safe Handling:	• Keep away from heat, sparks and flame. • Take precautionary measures against electrostatic discharges. • Do not taste or swallow. • Do not get in eyes, on skin or on clothing. • Avoid prolonged or repeated contact with skin if material is exposed.
Conditions for Safe Storage, Including any Incompatibilities:	• Store in a cool, dry place. • Keep away from sources of heat. • Keep away from sources of ignition. • Keep away from sparks or flames. • Keep away from combustible material. • Keep away from incompatibles materials. • Keep in shipping packaging when not in use. • Store in an approved storage unit, containing materials of compatible classification. • Ground all storage units containing material. • Storage should be in a BATF (Bureau of Alcohol, Tobacco, Firearms and Explosives) approved explosive magazine containing materials of compatible classification and stored according to Local, State, and Federal regulations.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

OSHA Permissible Exposure Limits (PEL):	• Boron (CAS# 7440-42-8) ◦ 15mg/m³ • Potassium Nitrate (CAS# 7757-79-1) ◦ 15mg/m³
American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV):	• Boron (CAS# 7440-42-8) ◦ 10mg/m³ • Potassium Nitrate (CAS# 7757-79-1) ◦ No data available
Appropriate Engineering Controls:	• Take precautionary measures against electrostatic discharges. • Ground storage units and working surfaces.
Individual Protection Measures, Such as Personal Protective Equipment:	• Wear appropriate protective eyeglasses or safety goggles. • Wear appropriate gloves to prevent possible skin exposure. • Clothing should be appropriate for handling pyrotechnic substances.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Physical State:	Cylindrical solid
Odor:	Not Applicable
Odor Threshold:	Not Applicable
pH:	Not Applicable
Melting/Freezing Point:	Not Applicable
Initial Boiling Point and Boiling Range:	Not Applicable
Flash Point:	Not Applicable
Evaporation Rate:	Not Applicable
Flammability (Solid, Gaseous):	Fire or Projection Hazard
Upper/Lower Flammability or Explosive Limits:	Not Determined
Vapor Pressure:	Not Applicable
Vapor Density:	Not Applicable
Relative Density:	Not Applicable
Solubility:	Boron/potassium nitrate is partially soluble in water
Partition Coefficient: N-Octanol/Water:	Not Determined
Auto-Ignition Temperature:	> 350° F
Decomposition Temperature:	Unknown
Viscosity:	Not Applicable

SECTION 10 – STABILITY AND REACTIVITY

Reactivity:	• Non-reactive under normal conditions of use, storage and transport.
Chemical Stability:	• Stable under normal temperatures and pressures.
Possibility of Hazardous	• Hazardous polymerization will not occur.

Reactions:	
Conditions to Avoid	• Keep away from heat, sparks, and open flame. • Avoid impact, friction, and static electricity. ◦ Unlikely, but possibly can be ignited by impact. ◦ Relatively insensitive, but can be ignited by static discharge.
Incompatible Materials:	• Contact with acids may lead to the release of hydrogen gas.
Hazardous Decomposition Products:	• Irritating and toxic gases or fumes may be released by thermal decomposition or combustion.

SECTION 11 – TOXICOLOGICAL INFORMATION

Information on the Likely Routes of Exposure:	• Skin contact – not likely • Skin absorption – not likely • Eye contact – not likely • Inhalation – possible, but not likely • Ingestion – not likely
Symptoms Related to Physical, Chemical, and Toxicological Characteristics:	No data available
Effects of Acute Exposure to Product:	• Eye: Not a likely route of exposure. May cause eye irritation. • Skin: Not a likely route of exposure. Low hazard for typical industrial and aircraft maintenance handling. • Ingestion: Not a likely route of exposure • Inhalation: Not a likely route of exposure. May cause respiratory tract irritation.
Effects of Chronic Exposure to Product:	• Eye: Not a likely route of exposure. May cause eye irritation. • Skin: Not a likely route of exposure. Low hazard for typical industrial and aircraft maintenance handling. • Ingestion: Not a likely route of exposure • Inhalation: Not a likely route of exposure. May cause respiratory tract irritation.
Numerical Measures of Toxicity:	No data available
Carcinogenicity:	Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA
Reproductive Toxicity:	No data available
Teratogenicity:	No data available
Mutagenicity:	No data available

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity:	No data available
Persistence and Degradability:	No data available
Bioaccumulative Potential:	No data available
Mobility in Soil:	No data available
Other Adverse Effects:	No data available

SECTION 13 – DISPOSAL CONSIDERATIONS

Product Packaging:	• Return live igniters to manufacturer. • Dispose of spent igniters in inert trash.
Special Considerations:	• Dispose of explosive materials according to Local, State, and Federal regulations.

SECTION 14 – TRANSPORT INFORMATION

Proper Shipping Name	Igniters
DOT Hazard Class	1.4G
DOT Reference No.:	EX-1998090143
Packaging Group	II
UN Number	UN-0325
UN Classification	1.4G
IATA Label:	1.4G PG II

SECTION 15 – REGULATORY INFORMATION

Safety, Health and Environmental Regulations for the Substance or Mixture:	• Listed on TSCA Inventory: ◦ Boron (CAS# 7440-42-8) ◦ Potassium Nitrate (CAS# 7757-79-1) • SARA – Not Applicable
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SECTION 16 – OTHER INFORMATION

Date of Preparation/ Last Revision: January 20th, 2021

SDS Prepared by:

Vulcan Systems, Inc.
P.O. Box 86
Florence, CO 81226
USA
Business: (719) 204-2000
info@vulcansystems.net

Full text of hazard classes and H-statements : see Section 16

H228 – Flammable solid
H272 – May intensify fire; oxidizer
H302 – Harmful if swallowed
H332 – Harmful if inhaled
H319 – Causes serious eye irritation
H335 – May cause respiratory irritation
H350 – May cause cancer



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**Pipeline and Hazardous
Materials Safety Administration**

**The US Department of Transportation
Competent Authority for the United States**

CLASSIFICATION OF EXPLOSIVES
FIRST REVISION

Based upon a request by Vulcan Systems, Inc., P.O. Box 6099, Colorado Springs, CO 80934, United States the following items are classed in accordance with Section 173.56, Title 49, Code of Federal Regulations (49 CFR). A copy of your application, all supporting documentation and a copy of this approval must be retained and made available to DOT upon request.

U.N. PROPER SHIPPING NAME AND NUMBER:

Igniters, UN0325

U.N. CLASSIFICATION CODE: 1.4G

REFERENCE NUMBER

EX1998090143

PRODUCT DESIGNATION/PART NUMBER

#VS-IGN-CERT, #VS-IGN-CERT-MOD 1

NOTES: This classification is only valid when the igniters are packaged as follows: Inner Packaging - Receptacles, plastic, with locking lids or cardboard tubes, each containing one igniter. Outer Packaging - UN 4G fiberboard box, each containing not more than fifty (50) inner packagings.

This approval as revised supersedes all previous versions.

DATED: 11/30/2012

For Dr. Magdy El-Sibaie
Associate Administrator for Hazardous Materials Safety